# NPLCC

## Science and TEK Subcommittee Meeting

Feb 29, 2012

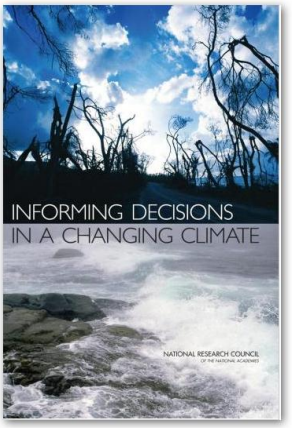
## NPLCC has a *decision support* function

- **The North Pacific Landscape Conservation Cooperative promotes development, coordination and dissemination of science to inform landscape level conservation and sustainable resource management in the face of a changing climate and related stressors.**
- **LCCs are "management-science partnerships that inform integrated resource-management actions addressing climate change and other stressors across landscapes"**

## What is needed for effective decision support?

Goal of a decision support program should be “to provide knowledge that people need to make better decisions and to do so in ways that enable and empower decision makers to use it appropriately.”

- Six principles
  (2009 National Academies report)
  1. Begin with user’s needs
  2. Give priority to processes over products
  3. Link information producers and users
  4. Build connections across disciplines and organizations
  5. Seek institutional stability
  6. Design for learning






## Begin with user’s needs…

- **Effective and useful decision support must start with a clear understanding of the decisions that are to be supported**
- **NPLCC Steering Committee addressed some of these questions in a Framing Workshop in October, identifying**
  - Type of decisions the NPLCC aims to support (and examples of the kinds of decision-makers involved)
  - Outcomes likely to be of interest to resource managers as they make those decisions.

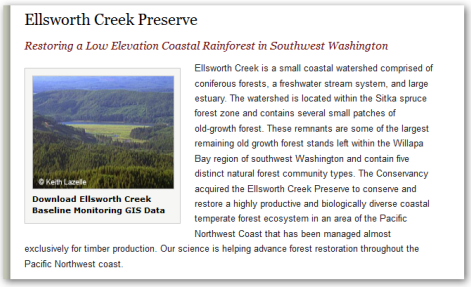
# Two types of LCC-relevant decisions

- **Decisions supported by the LCC**

  Natural resource management decisions and conservation delivery efforts that the LCC is intended to inform and support

  Examples:

  – Land acquisition of sensitive areas
  – Species recovery plans



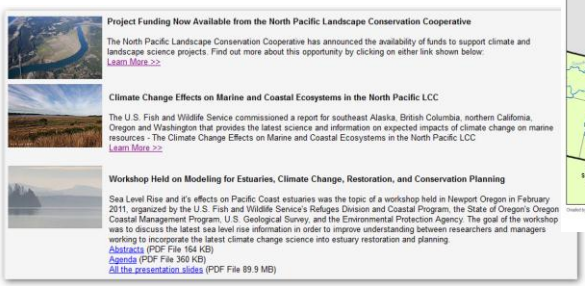
# Two types of LCC-relevant decisions

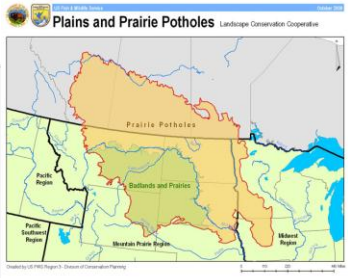
- **Decisions that the NPLCC itself makes**

  how to organize, how best to define and meet the NPLCC mission, where to focus efforts and resources, what applied science to support in what time frames, and so on.

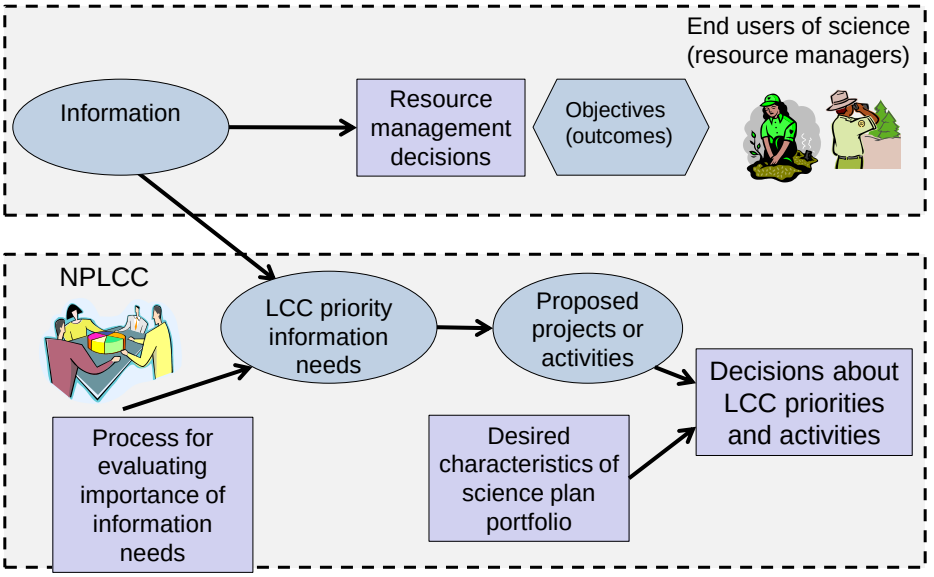
  Examples:

  – Selection of activities
  – Boundaries and internal organization



## Process & Framing Workshop






## How do we use this framing going forward?

- **As you develop science and information priorities for the NPLCC, it is important to ask yourselves:**
  - What partner or customer(s) needs or can use this information (or data, or product)?
  - What conservation and sustainable resource management decisions will the information help support?
  - Will the data or product provide useful information about an outcome of interest to those partners or customers?

# Science Planning Processes

## Motivating questions

- **What are the important information gaps to address?**
- **What are the best approaches for addressing those information gaps?**
- **What mix of research, over what time period, will be most useful to NPLCC partners?**

## Five steps to developing a science plan

- **Identify potential science/information needs**
  - "Science needs" are unknowns or uncertainties which affect the ability
- **Ide**
  - I
  - Information being collected by others?
- **Prioritize science/information needs**
  - Prioritized needs can be used to target future projects and/or RFPs
- **Develop & evaluate projects**
- **Establish and incorporate portfolio-level considerations for creating the desired mix of projects**

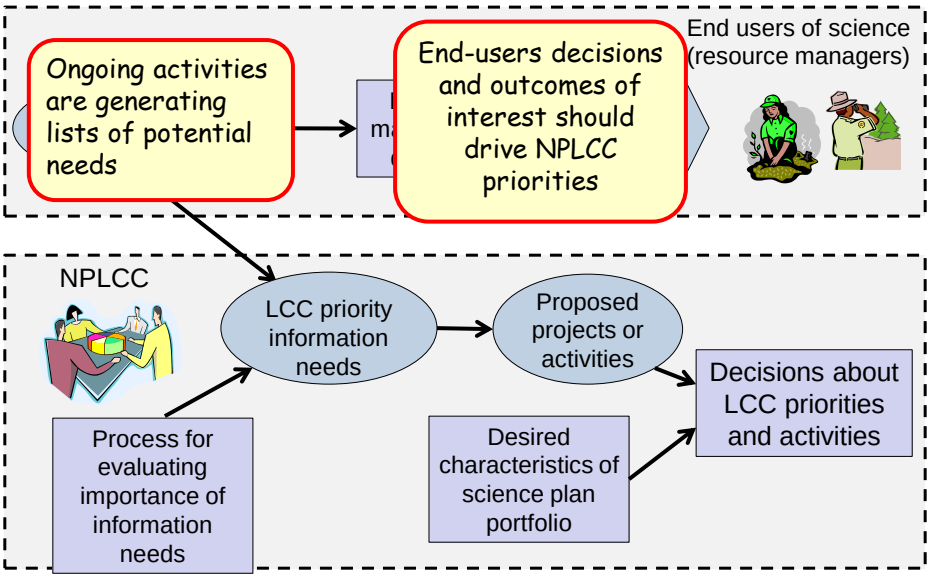
What are the important information gaps to address?

What are the best approaches for addressing those gaps?

What mix of research is most useful?



## Conceptual Process for Science Planning



## Key concepts for each step

- **Identification of needs should be driven by the management questions facing NPLCC partners**
- **Prioritize needs based on potential information value**
  - Derives from the ability to use that information to improve management decisions
- **Project evaluation can and should be separate from the "priority" of the question being addressed**
- **Strong portfolio requires consideration of factors in addition individual project value**



## Clear separation of the steps…

- **Allows for (requires) broad participation in the identification of potential information needs**
- **Can help identify current information-sharing opportunities**
- **Leads to identification of science priorities before project solicitation and evaluation**
  - Let the management questions drive the science priorities
- **Leads to a better targeted work and, possibly, a better targeted RFP**
  - With the projects solicited to address priorities, rather than priorities derived from proposals
- **Allows projects to be evaluated using traditional scientific review process, if desired**
- **Explicit "overlay" of science plan objectives separate from the technical merit of proposals**

## Approaches for identifying (possible) information needs

- **Three approaches explored in October Framing workshop**
  - Biogeophysical models, including extraction of common themes
  - Decision-focused conceptual models to identify critical uncertainties
  - Brain-stormed list of information needs
- **Several additional approaches will be described this morning**
- **Other approaches being used**
  - Large LCC-wide Science Workshop (e.g., W. Alaska LCC)
  - Survey or compile a list from partner agencies (e.g., Appalachian LCC, Pacific Islands CCC)

To provide effective decision support, it is critical that information "needs" be connected to decisions and to outcomes of interest



## Approaches for prioritizing information needs

- **Formal Value of Information (VOI) analysis**
  - The "gold standard" for valuing information collection opportunities and options for well-defined decisions
- **Sensitivity analysis**
  - Useful for understanding how changes in key variables translate to changes in outcomes of interest
- **Multi-attribute utility analysis (MUA)**
  - A tool for comparing options (in this case information collection opportunities) using multiple criteria simultaneously
- **Non-analytical approaches**
  - E.g., surveys, polling, voting, etc.

## Approaches for evaluating and selecting projects

- **Standard approach**
  - Define and include a set of project evaluation criteria in an RFP (or clearly specify a desired product and seek a researcher who can deliver that product)
  - Committee of evaluators judge how well each project meets the criteria
    - ***Can be done informally or formally***
  - Top ranked project(s) selected
- **Issues to consider**
  - Often try to include too much in the set of evaluation criteria
  - Useful to separate the importance of the underlying problem being addressed from the quality of the proposed work itself



## Approaches for portfolio construction and analysis

- **Rank projects and fund "from the top down"**
- **Multi-attribute**
- **Portfolio simulation**
  - Often with Portfolio Optimization
- **Modern portfolio theory**
  - Efficient frontiers

Main complication is that the decision-maker almost always has objectives that relate to portfolio "balance"

## Often try to do too much within project evaluation!

- **Some project evaluation criteria used by various LCCs**
  - Whether they address specifically identified topics
  - Specific type of information
  - Breadth of project; multi-disciplinary
  - Decision relevance
  - Climate relevance / relevance to landscape-level stressors
  - Time scale of project
  - Time scale of issues addressed
  - Connection to FWS and other Partner Missions
  - Partnerships/leveraging
  - Relationship to other ongoing work / value added
  - Geographic scope
  - Multiple / cross- taxa focus
  - Scientific / professional merit
  - Programmatic capability
  - Inclusion of education / outreach components
  - Project management & evaluation plan
  - Budget



## Example criteria – information needs

- **Considerations in evaluating the priority or importance of addressing an identified information need**
  - Decision-relevance of the information
  - Breadth or range of decisions the information could support
  - Urgency / timing of information needs relative to decision needs
  - Opportunity for information collection & uncertainty reduction exists now that will not exist later.
  - Criticality of LCC-level participation (e.g., is not currently be addressed by anyone else)

## Example criteria – project evaluation

- **Considerations in evaluating a proposal or a proposed provider of needed information**
  - Responsiveness to the scope of the request
  - Scientific merit / soundness of the study proposal
  - Qualifications of the team / programmatic capability
  - Timeliness of study results
  - Adequacy of plan for sharing and communicating study results to interested partners and stakeholders



## Example portfolio considerations

- Support/promote work in different geographic and ecologic areas within the LCC
- Address multiple taxa
- Include both “quick wins” and longer term projects
- Include projects which have high probability of success and some that are higher risk
- Include projects that address each (or some subset) of identified “priority” information needs
- Etc…

## Example criteria for each evaluation step

| Priority/importance of information need | Project evaluation | Portfolio considerations |
|---|---|---|
| • Decision-relevance of the information<br>• Breadth or range of decisions the information could support<br>• Urgency / timing of information needs relative to decision needs<br>• Opportunity for information collection & uncertainty reduction exists now that will not exist later.<br>• Criticality of LCC-level participation (e.g., is not currently be addressed by anyone else) | • Responsiveness to the scope of the request<br>• Scientific merit / soundness of the study proposal<br>• Qualifications of the team / programmatic capability<br>• Timeliness of study results<br>• Adequacy of plan for sharing and communicating study results to interested partners and stakeholders | • Support/promote work in different geographic and ecologic areas within the LCC<br>• Address multiple taxa<br>• Include both "quick wins" and longer term projects<br>• Include projects which have high probability of success and some that are higher risk<br>• Include projects that address each (or some subset) of identified "priority" information needs<br>• Etc… |



## S/TEK challenges – Science Strategy

- **Comprehensive set of potential information needs**
  - Include perspectives of all NPLCC partners
  - Focus on *unmet* needs
- **Clearly define prioritization criteria (for information needs)**
- **Develop and incorporate and portfolio-level considerations in strategy development**
- **Balance need for transparency and defensibility with time and effort required to analyze & prioritize**

## S/TEK challenges – FY12 priorities

- **Relatively small amount of resources available and priorities must be established quickly**
- **Balance efforts between:**
  - Identifying potential information needs and FY12 activities
  - Prioritizing those needs/activities
- **Use FY12 prioritization to initiate & test criteria and approach for longer-term strategy development**